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LONG RANGE FORECASTS

Note on Baur's method of 10 day forecasting

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There does not appear to be any clear published account of the methods by which F. Baur prepared the 10-day forecasts which were issued by the German Institute for Long-Range Forecasting from 1932 onwards. The following notes are summarised from a paper by Baur himself in the Bulletin of the American Met. Soc 17, 1936 which is however obscure in places. The main basis is a series of charts which are prepared for overlapping intervals of 10 days (decades) advancing by steps of one day. 10-day means are used to smooth out the irregularities introduced by weather processes in the troposphere and so obtain the 'broad-weather' situation for each decade he has:

1. Map of the mean departure of the pressure from normal

2. Map of the change of pressure from the first to the second pentad

3. Map of the change of mean midday temperature from the first to second pentad

4. Map of the change of pressure in the last 5 days

5. Map of the interdiurnal variability of pressure in the last 6 days

6. Map of the distribution of pressure on the morning of the last day.

He also has charts and tables of previous years of the various elements to be forecast and multiple correlation tables in which are set out in tabular form for each decade the relations between the various elements (1 - 6 above) used in forecasting and the subsequent weather elements. These tables are used

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to search out all instances with similar elements in the same decade (± 5 days) in the past 40 years to those in the decade on which the forecast is based. These instances are each singly compared with the present advance weather and useless cases rejected. As a rule there remain two or three cases in which all six charts are similar. These are analysed synoptically to determine the probable weather; in this analysis observations of pressure and temperature up to 5 km and any rhythms present are also introduced, but the precise method is not given. Judging by the emphasis which Baur lays on the steering properties of the pressure distribution at 5 km., the latter play a large part.

Comments. Baur himself claims a success over 80 per cent in each summer from 1933 to 1936 inclusive (the forecasts were issued only in summer), but L F. Vega and F. F. Clapp in Monthly Weather Review Supplement no 39 estimate the percentage as 75 for the first 5 days and only 58 per cent for the last 5 days of the forecast periods, 50 per cent. representing the result of chance.

Baur's laborious calculations are intended to extract the last ounce out of the information to be drawn from similar situations in the past. Although he states that "in the final estimate all known facts and additional indications which may have a bearing on the future weather development are taken into consideration", his account of the latter process is so vague that it seems doubtful if this is really the case.

In particular Baur apparently limits consideration entirely to the happenings within a period of 10 days immediately preceding the forecast date. While a close measure of agreement over 10 days looks like giving a promising indication of the future weather, the chances should be improved by a comparison over a longer period, especially as regards the broader tendencies.

The principle of "steering" of nuclei of pressure change appears to be especially valuable, but requires to be brought into closer relationship on the one hand with the 72 and 36 day waves and on the other hand with the 6-day and shorter waves existing at the time when the forecast is made. (This was done by Schmidel in 1937).